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SMITH, GAMBRELL & RUSSELL  
1130 CONNECTICUT AVENUE, N.W., SUITE 1130  
WASHINGTON, DC 20036

EXAMINER
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NGUYEN, NGOC YEN M

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/020,920  
Filing Date: December 19, 2001  
Appellant(s): MANGOLD ET AL.

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Thomas Wiseman  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed February 26, 2009 appealing from the Office action mailed August 16, 2007.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,372,648	Hall et al	04-2002
6,423,638	Vanell	07-2002
CA 2,223,377	Mangold et al	06/1998

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 3-7, 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over CA 2,223, 377 in view of Vanell (6,423,638) or Hall et al (6,372,648).

CA '377 discloses a process for preparing pyrogenically-prepared oxides of metals and/or non-metals, wherein an aerosol is fed to a flame such as is used for preparing pyrogenic oxides by flame hydrolysis, the aerosol being homogeneously mixed with the gas mixture for flame oxidation or flame hydrolysis prior to reaction, the aerosol/gas mixture is allowed to react in the flame and the resulting doped pyrogenically-prepared oxides are separated from the gas stream (note claim 3). The aerosol is produced by nebulization using a two-fluid nozzle (note claim 5). CA '377 further discloses that the doping component is from 0.00001 to 20 wt% (note claim 1), preferably from 1-10,000 ppm (note claim 2) and the doped oxides have a BET surface

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area between 5-600 m<sup>2</sup>/g (note claim 1). These ranges overlap the claimed ranges. With respect to the encompassing and overlapping ranges previously discussed, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time of invention to select the portion of the prior art's range which is within the range of the Appellants' claims because it has been held prima facie case of obviousness to select a value in a known range by optimization for the results. *In re Boesch*, 205 USPQ 215. Additionally, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness. *In re Malagari*, 182 USPQ 549.

The doped metal oxides can be potassium-doped silica (note Example 5). In Example 5, a 0.5% aqueous potassium chloride solution is used (note page 11, lines 31-32). The value of "0.5 %" as disclosed in CA '337 would have suggested to one of ordinary skill in the art a slightly higher value, i.e. higher than 0.5 % as required in the instant claims, based upon a reasonable expectation of success, *In re O'Farrell*, 853 F.2d 894, 904, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988). The concentration of the potassium in the doped silica product is 300 ppm ( = 0.03%) (note Table 2, run No. 5), this value is well within the claimed ranges of "about 0.03%" in the instant claim 1 and "more than about 0.03%" (i.e., "about 0.03" would include values such as "0.025" and the value of "0.03" as disclosed in CA '227 is more than "0.025") in the instant claim 10. In any event, the teaching of CA '337 should not be limited to just the value of "0.03" as

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disclosed in Example 5, CA '337 discloses a broad range of 0.00001 to 20 wt% for the doping component (note claim 1), preferably 1 to 10,000 ppm (= 0.0001 – 1%) (note claim 2). It would have been obvious to one of ordinary skill in the art to optimize the concentration of the potassium chloride used in order to produce potassium doped silica having the amount of dopant within the desired range of 1 to 10,000 ppm. In Example 5, the pH of 4% aqueous suspension is 4.83 (note Table 2, run No. 5). This value would have suggested to one of ordinary skill in the art a slightly higher value, i.e. higher than 5 as required in the instant claim 1, based upon a reasonable expectation of success.

From Figure 1, air is fed with hydrogen and  $\text{SiCl}_4$  (note bottom row, third box from the left) and later as “secondary air” (note bottom row, fourth box from the left), the air in these steps are considered as “adding oxygen” as required in the instant claim 11 since the instant claim does not require the oxygen to be pure oxygen.

For the “spherical shaped” and the absorption of dibutylphthalate of the oxide product, since the process disclosed in CA '377 is the same or very similar to the claimed process, the silica product of CA '377 would inherently have the same spherical shape and the same absorption property. Moreover, it is well known in the art that flame hydrolysis produces mostly spherical particles. The values for the breadth of distribution of particle size and the pH of a 4% aqueous suspension for the product of CA '377 would overlap the claimed ranges because the product of CA '377 has an overlapping dopant concentration and is produced by the same method using an overlapping range for the concentration for the doping component.

CA '377 does not disclose specifically the breadth of the distribution of particle size.

It is noted that in the instant specification, the breadth of the distribution of particle size is defined as the quotient  $d_n/d_a$  and if the quotient  $d_n/d_a$  has the value of 1, a monodisperse distribution (i.e., uniform size), that is the closer the value to 1 the closer the distribution of particle size is (note page 1, first full paragraph). Thus, when a product is disclosed as having uniform size or narrow particle size distribution, its breadth of the distribution of particle size would be at least 0.7 or as close to 1 as possible.

In case the product of CA '377 does not directly produce a product having the claimed breadth of distribution of particle size, the desire of monodispersed product is well known and conventional in the art. Thus, it would have been obvious to one skill in the art to subject the product of CA '377 to a screening process in order to obtain a monodispersed product.

CA '377 teaches that the product can be used as fillers, as polishing materials for polishing metal or silicon wafers in the electrical industry, such as CMP applications, etc. (note page 4, lines 11-21).

Vanell '638 is applied to teach that ideally, a polishing slurry comprises abrasive particles having a size distribution in a narrow range, i.e., the abrasive particles are of uniform size (note column 2, lines 47-50). When the polishing slurry has a wide distribution of particle sizes, the filter is used to filter out particles above a predetermined size (note paragraph bridging columns 2-3).

Alternatively, Hall '648 can be applied to teach that CMP finds extensive applications in the Shallow Trench Isolation (STI) process to planarize uneven surfaces. Silica powder with tight particle size specifications is preferably selected as abrasive component for this CMP process because it produces smooth, scratch free surfaces (note paragraph bridging columns 1-2).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to either optimize the process condition of the process of CA '377 to produce a product with narrow particle size distribution or to use a filter to remove particles outside of the predetermined size (except for the instant claim 10 which has "consisting of" language) to obtain a product with a narrow size particle size distribution because in order for the product of CA '377 to be used in CMP application, the silica particles are required to have narrow particle size distribution, as suggested by Vanell '638 or Hall '648.

#### **(10) Response to Argument**

##### **1. Argument for method claim 10**

Appellants argue that CA '337 does not teach or suggest a two step method where an aerosol is formed from an aqueous solution having a potassium salt concentration of more than five percent by weight is used.

It should be noted that "five percent" as stated in the above argument is in error, Appellants' claim 10 only require the potassium salt concentration to be "more than



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0.5% by wt". In CA '377, Example 5 discloses the use of a potassium chloride solution of 0.5% to produce a doped silica having 300 ppm of potassium, however, the disclosure of CA '377 is not limited to just the examples. CA '377 discloses that the preferred range for the amount of dopant is 1-10,000 ppm and CA '377 fairly discloses that when the concentration of the salt solution is higher, the resulting dopant amount is higher, for example, in Examples 2 and 4, when the concentration of the cerium salt solution (an analogous dopant salt to the potassium chloride of Example 5) of 5% is used, the dopant amount in the product is 1860 or 2350 ppm (for Example 2 and Example 4, respectively, note Table 2, runs No. 2 and 4).

Appellants argue that claim 10 method is limited to the two recited steps and the claimed product comprising pyrogenic-doped oxide particles having a breadth of particle distribution of at least 0.7 is recovered directly from the gaseous reaction mixture.

As stated in the above rejection, it would have been obvious to one skill in the art to optimize the process condition in the process of CA '377 in order to directly obtain a doped silica having narrow particle size distribution so that it could be used in CMP application, as suggested by Vanell '638 and Hall '648. It should be noted that the apparatus used in Appellants' claimed invention, i.e. a "burner with a known design in accordance with DE 196 50 500 A1" (note Example 1) is the same as that of CA '377 because DE '500 and CA '377 belong to the same patent family. Appellants have not provided sufficient evidence to show that the process of CA '377 could not be optimized to produce product with narrow particle size distribution.

Appellants argue that no range of potassium salts is expressly taught and no purpose, other than doping is taught for the dopant material.

In CA '377, the general disclosure for the dopant amount, 1-10,000 ppm (note claim 2), is applicable to all suitable dopants disclosed therein, especially the exemplified cerium and potassium. This range is well within the claimed range. Similarly, the various uses disclosed in CA '377 are for any of the doped oxides disclosed in CA '377, especially the exemplified cerium-doped or potassium-doped silica.

Appellants argue, in footnote 5, that Appellants' claims exclude the amount of 0.5% by weight that is disclosed in Example 5 of CA '377.

Again, the disclosure of CA '377 should not be limited to just the Example 5. CA '377 discloses a broad range of 0.00001 to 20 wt% (note claim 1) and a preferred range of 1 to 10,000 ppm (note claim 2). The high dopant amount in the final product fairly teaches the use of a high concentration for the salt solution.

Appellants argue that the experimental conditions mentions in Example 5 of CA '337 differ from those described in the instant specification, e.g. additional oxygen.

In Appellants' claims, except for claim 11, there is no requirement for any additional oxygen. In any event, as shown in the Figure 1 of CA '337, secondary air, which is considered the same as the "additional oxygen" can be added (note bottom row, 4th box from the left). Granted that differences in experimental condition" result in product differences, as argued in Appellants' footnote 7, however, for Example 5 of CA '377, the BET surface area is still within the claimed range, the amount of dopant and

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the pH are very close the claimed ranges, all these fairly suggest that the process conditions, including the concentration of the metal dopant salt, can be optimized to obtain the desired product, i.e. a silica doped with potassium in an amount of 1-10,000 ppm as disclosed in CA '377 and having a narrow particle size distribution as suggested by Vanell 638 or Hall '648.

Appellants argue, in footnote 8, that CA '337 does not teach the process as claimed because the rejection based on anticipation by the primary reference (CA '337) was withdrawn.

The 102 rejection over CA '337 is withdrawn because it appears that not all process conditions in CA '337 will produce a product with narrow particle size distribution. For the 103 rejection, as applied above, with the suggestion from Vanell '638 or Hall '648 that silica product with narrow particle size distribution is desired for using in CMP application, it would have been obvious to one skilled in the art to optimize the process conditions in CA '377 to obtain a product with the desired narrow particle size distribution.

Appellants argue that the applied references do not disclose a result-effective variable which has been deemed obvious to optimize and would arrive at the claimed potassium concentration and the recovered product.

In CA '377, all process conditions are fairly disclosed, note Figure 1 and the examples, therefore, even though CA '377 does not specifically disclose a result-effective variable as argued by Appellants, it would still have been obvious to one skilled in the art to conduct routine experimentation to optimize these process conditions in

order to produce a produce with narrow particle size distribution as suggested by Vanell '638 or Hall '648.

Appellants argue that CA '337 does not identify a correlation of the breadth of doped particle distribution with dopant concentration.

In Appellants' specification, there is no disclosure of a correlation between the breadth of doped particle distribution with dopant concentration. Even if there were, since CA '377 disclosed a preferred range of 1-10,000 ppm for the dopant amount, it would have been obvious to one skilled in the art to use higher potassium salt solution concentration (higher than 0.5% as disclosed in Example 5) to obtain a silica product with higher amount of potassium dopant (higher than 300 ppm as disclosed in Example 5) to thereby inherently achieve the same breadth of doped particle distribution, i.e. narrow particle size distribution.

Appellants argue that the secondary references are not directed to the manufacture of potassium doped pyrogenic produced metal or metalloid oxide particles.

The secondary references are only applied to teach that for CMP (chemical mechanical polishing) application, silica having uniform particle size or narrow particle size distribution is desired, not to teach the potassium doped silica product. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The claim requires the recovery of a specified product; knowledge of the existence of that product would have been required so that it would have been obvious to recover.

For the process of CA '337, the potassium doped silica is clearly recovered, whether it has narrow particle size distribution or not. For the combined teaching of CA '337 and the secondary references, the product would have narrow particle size distribution as required in Appellants' claims.

Appellants argue that Appellants' experimental conditions are distinct from those taught in Example 5 of CA '337.

Again, the teaching of CA '337 should not be limited to just the Example 5, see reasons as stated above.

Appellants argue that the secondary references fail to remedy the deficiencies of the primary reference since they contain no teaching of potassium salts as a result-effective variable.

The argument is not persuasive for the same reasons as stated above, i.e. the secondary references are not relied upon to teach potassium salts as a result-effective variable.

Appellants argue that Vanell '638 does not mention of how one can achieve abrasive particles having a size distribution in a narrow range.

Vanell '638 is not relied upon to teach how to produce abrasive particles having a narrow particle size distribution. As stated in the above rejection, CA '377 fairly teaches that the doped silica can be used in CMP application, and as suggested by Vanell '638,

silica used in such application is desired to have narrow particle size distribution, thus, it would have been obvious to one skilled in the art to optimize the process conditions in CA '377 to obtain a product with the desired particle size distribution.

Appellants argue that Hall does not teach potassium or potassium salt concentration as a factor in controlling the breadth of particle size distribution.

Hall '648 is not relied to teach the argued feature. This argument is not persuasive for the same reasons as stated above (for Vanell '638).

Appellants argue that the secondary references do not suggest their combinability with the primary references.

The motivation for combining CA '377 with either Vanell '638 or Hall '648 is clearly stated in the above rejected. In response to Appellants' argument in footnote 11 that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Appellants argue that there is no apparent problem existing in the primary reference for which the Vanell filter or the Hall silanization process would be sought as a solution and CA '377 does not mention the presence of large particles produced by agglomeration or aggregation or conditions which would result in their production.

As discussed above, the process of CA '377, probably for most of process conditions, does indeed produce a product without large particles, which fairly suggests that the particle size distribution is narrow, just as argued by Appellants, however, since there is no clear indication that the process of CA '377 would *inherently* produce narrow particle size distribution, the secondary references are applied to provide the motivation to optimize the process of CA '377 to ensure that no large particles is formed so that the product has narrow particle size distribution as suggested by Vanell '638 or Hall '648.

Appellants argue that the filtration step as suggested by Vanell '638 would be excluded by the "consisting of" language.

Vanell '638 is only applied to teach that the particles used for CMP application is desired to have narrow particle size distribution and when CA '377 is taken in view of Vanell '638, the process conditions in CA '377 can be optimized to obtain directly a product with narrow particle size distribution, therefore, no filtration step is needed.

Appellants argue that Hall is directed to silanization of silica to impart stability at alkaline pH and the "consisting of" would exclude such silanization step.

Similar to Vanell '638, Hall '648 is only applied to teach that the particles used for CMP application is desired to have narrow particle size distribution, not to teach the silanization step.

Appellants argue that Vanell reference directed to dispersions containing precipitated silica does not provide sufficient guidance as to how to adapt its teaching to potassium doped pyrogenically produced silica recovered from a gaseous phase.

Vanell is only applied to provide the motivation to use particles having narrow particle size distribution for CMP application, one skilled in the art would be able to optimize the process of CA '377 itself to obtain the desired product without relying on any method or step disclosed in Vanell '638.

Appellants argue that the Office action suggests any particle size range present in Example 5 product of CA '337 can be further narrowed by filtration.

This part of the rejection is only for Appellants' claim 4, which has the "comprising" language, not for Appellants' claim 10. In any event, it would have been obvious to one skilled in the art to use any known means, not just the means disclosed in Vanell '638, as long as such means is capable of separating and removing the undesired particle size from the product of CA '377.

2. Argument for method claims 4, 6-7 and 11.

Appellants argue that claim 4, like claim 10, requires the presence of a potassium salt concentration more than 0.5% by wt.

This argument is not persuasive for the same reasons as stated above for claim 10.

Appellants argue in footnote 15 that the instant specification discusses the unexpected nature of the morphological changes in potassium doped pyrogenically produced silica particle first seen at a minimum potassium concentration.

Any criticality of unexpected result should be compared to the closest prior art; in this case, CA '377 clearly discloses a potassium doped silica product. There is no



sufficient evidence on record to show the criticality of a potassium salt concentration of “more than 0.5%” as required in Appellants’ claims as compared to the value of “0.5%” as disclosed in CA ‘377. As shown in Appellants’ Examples and drawings, the lowest concentration used is 2.22 %.

Appellants argue that the closed nature or open nature of the transition would not impact the arguments.

Appellants’ arguments for claim 4 are not persuasive for the same reasons as stated above for claim 10. Also for claim 4, since the claim has "comprising" language, it would have been obvious to one skilled in the art to operate the process of CA ‘377 under any conditions as long the product is a potassium doped silica with the desired dopant amount of from 1-10,000 ppm and if the product does not have a narrow particle size distribution, it would have been further obvious to one skilled in the art to subject the obtained product to a classification step to remove any undesired particle sizes in order to achieve the narrow particle size distribution as suggested by Vanell '638 or Hall '648.

### 3. Argument for product claims 1-3.

Appellants argue that claim 1 is directed to potassium doped pyrogenically produced metal or metalloid, e.g. silica, particles having 0.03 to 20% by weight potassium uniformly distributed within the particle size of at least 0.7.

It should be noted that claim 1 requires the concentration of the dopant is “about 0.03%” and the 0.03% as disclosed in Example 5 of CA '377 is within this claimed

range, thus, the narrow particle size distribution would inherently be obtained for the product of CA '377. In any event, CA '377 discloses the broad range of 0.0001 to 20 wt% for the dopant amount (note claim 1) and the preferred range of 1-10,000 ppm (note claim 2). For the particle size distribution, note the reasons as stated above for the process claims.

Appellants argue that the primary reference does not reasonably teach the product or render it obvious and the secondary references provide no guidance as to how the CA '377 product could be modified to arrive at the product claimed.

These arguments are not persuasive for the same reasons as stated in the above.

Appellants argue in footnote 16 that there is no range of potassium salts expressly taught in the reference.

The ranges for the amount of dopant in the product disclosed in claims 1-2 of CA '377 are applicable to all suitable dopants listed therein, especially the exemplified cerium and potassium. It would have been obvious to one skilled in the art to select a suitable concentration for the dopant salt in order to obtain the desired dopant amount in the final product, i.e. the higher the concentration of the salt, the higher the dopant amount in the product. The disclosure of CA '377 is not limited to just the Example 5 for the concentration of potassium salt.

Appellants argue in footnote 17 that there is no overlapping range of potassium salt concentration.

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Again, the overlapping amount of dopant in CA '377 fairly teaches or suggests an overlapping concentration for the dopant salt.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Ngoc-Yen M. Nguyen/  
Ngoc-Yen M. Nguyen  
Primary Examiner, Art Unit 1793

Conferees:

/Stanley Silverman/

Supervisory Patent Examiner, Art Unit 1793

Stanley Silverman

Roy King

/Roy King/

Supervisory Patent Examiner, Art Unit 1793